Algebraic Expressions
Unit 1

Day	*Section*	*Topic*	*Assignment*
1	*1.1*	*The Real Numbers*	A ***Pg 12** 1-14 all **(Done)*** B ***Repeating decimals Wksht***
2	*1.1*	*Properties of Real Numbers* *Order of Operations*	C ***Pg 14** 51-66,85-88 all **(Done)** **Pg 12-13** 15-42* D *all **(Done)*** E ***Wksht, pg 23** 1-28 all*
3	*1.2*	*Order and Absolute Value*	G ***Pg 23-24** 29-48, 60-64 all*
4	*1.6*	*Exponents*	H ***Pg 33** 1-12 all **(Done)*** I ***Pg 36** 95-98 all* J ***Pg 61** 29-52 all* K ***Pg 63-64** 97-100 all*
5		*Review*	L Exp wksht
6		*Test Unit 1*	M Int Problems N O IRR # Review

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Need to type review

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EXPONENTS WORKSHEET (1)

KEY

Simplify each of the following using the definitions and rules of exponents:

A. 1. $a^6 \cdot a^4 \cdot a^3 = a^{13}$

2. $y^{\frac{2}{5}} \cdot y^{\frac{1}{3}} = y^{\frac{6}{15}} \cdot y^{\frac{5}{15}} = y^{\frac{11}{15}}$

3. $x^{-4}x^6 = x^2$

4. $3^{m+2} \cdot 3^{2m-5} = 3^{3m-3}$

5. $x^{-8}x^8 = x^0 = 1$

6. $4^{-2} \cdot 4^{-1} = 4^{-3} = \frac{1}{4^3} = \frac{1}{64}$

7. $(a+7)^{\frac{1}{4}} \cdot (a+7)^{\frac{1}{2}} = (a+7)^{3/4}$

B. 1. $\left(2x^2y^3\right)^5 = 32x^{10}y^{15}$

2. $\left(4x^{16}y^{10}\right)^{\frac{1}{2}} = 2x^8y^5$

3. $\left(x^{\frac{1}{2}}y^{\frac{2}{3}}\right)^6 = x^3y^4$

4. $\left(x^{2p+1}\right)^3 = x^{6p+3}$

5. $\left(y^{\frac{2}{x}}\right)^{3x} = y^6$

6. $\left(x^4y^{\frac{2}{5}}\right)^{\frac{1}{8}} = x^{1/2}y^{1/20}$

7. $\left(\frac{4x^{\frac{5}{6}}}{y^{\frac{2}{3}}}\right)^3 = \frac{64x^{5/2}}{y^2}$

C. 1. $\frac{a^7}{a^4} = a^3$

2. $\frac{x^{\frac{4}{9}}}{x^{\frac{1}{3}}} = x^{1/9}$ $\quad \frac{1}{3} = \frac{3}{9}$

3. $\frac{m^{17x}}{m^{5x}} = m^{12x}$

4. $\frac{(x+2)^3}{(x+2)^5} = \frac{1}{(x+2)^2}$

5. $\frac{4^{2a+1}}{4^{a-6}} = 4^{a-5}$

D. 1. $\frac{36m^5n^9}{10m^{11}n} = \frac{18n^8}{5m^6}$

2. $\frac{(-3)^{14}(-3)^{-12}}{2^2 \cdot 2^3} = \frac{(-3)^2}{2^5} = \frac{9}{32}$

3. $\frac{3^{\frac{6}{7}} \cdot 3^{\frac{9}{7}}}{3^2} = \frac{3^{15/7}}{3^2} = 3^{1/7}$ $\quad 2 = \frac{14}{7}$

4. $\frac{\left(\frac{2}{3}\right)^2}{\left(\frac{2}{3}\right)^5} = \frac{1}{\left(\frac{2}{3}\right)^3} = \frac{1}{\frac{8}{27}} = \frac{27}{8}$

5. $\left(\frac{x^4yz}{16x^{-6}yz^5}\right)^{\frac{1}{2}} = \frac{x^2y^{1/2}z^{1/2}}{4x^{-3}y^{1/2}z^{5/2}} = \frac{x^5}{4z^2}$

EXPONENTS WORKSHEET (2)

Simplify (only positive exponents-no like bases) the following using the definitions/rules of exponents. Assume all variables represent positive real numbers unless otherwise indicated. DO NOT use complex fractions.

1. $\dfrac{(5x)^{-2}(x^{-3})^{-4}}{(25^{-1}x^{-3})^{-1}}$

2. $\dfrac{(2k)^{-3}(k^{-5})^{-1}}{(6k^{-2})^{-1}(k^{3})^{-6}}$

3. $\left(\dfrac{x^{13}(x^{5})^{-7}}{(2x^{7})^{2}}\right)^{-\frac{1}{7}}$

4. $\left(\dfrac{y^{\frac{2}{5}}\cdot y^{\frac{4}{5}}}{y^{\frac{1}{5}}\cdot y^{\frac{6}{5}}}\right)^{-5}$

5. $\dfrac{(3m^{3})^{2}(my)^{-1}}{(25y^{-4}m^{14})^{\frac{1}{2}}}$

6. $\dfrac{3x^{3}y^{-\frac{1}{5}}z^{\frac{2}{9}}}{4x^{-2}z^{\frac{1}{3}}}$

7. $5p^{r}(6p^{3-2r})$ where $r > 3$

8. $(-z^{2r})(4z^{r+3})$

9. $\dfrac{(b^{2})^{y+1}}{(2b^{y})^{3}}$ where $y < 2$

10. $\dfrac{(3x^{n})^{3}}{(x^{2})^{n-1}}$

11. $\dfrac{z^{-p+1}\cdot z^{-8p}}{z^{-9p}}$

12. $\dfrac{(x^{-y})^{-3}}{x^{2y}\cdot x^{5y-1}}$ if $y < 0$

M

NAME Key

PERIOD _____ DATE _____

SOME INTERESTING PROBLEMS

1) Show that $(1 + 2^3)^{-1} + (1 + 2^{-3})^{-1} = 1$

$\frac{1}{1+2^3} + \frac{1}{1+2^{-3}} = 1$

$\frac{1}{9} + \frac{1}{1+\frac{1}{8}} \stackrel{?}{=} 1$

$\frac{1}{9} + \frac{1}{\frac{9}{8}} \stackrel{?}{=} 1$

$\frac{1}{9} + \frac{8}{9} \stackrel{?}{=} 1$

$\frac{9}{9} \stackrel{?}{=} 1$

$1 = 1$ ✓

2) If $a^7 = 30$, what is a^{21}?

$(a^7)^3 = (30)^3$

$a^{21} = 27{,}000$

3) If radius of a circle is doubled, by what factor will the area change?

$A = \pi r^2$ $\quad A = \pi (2r)^2$

$A = 4\pi r^2$ (4)

4) If $x = \frac{1}{4 - y}$, compute $\frac{1}{x} + 4x + y - xy - 1$ (4)

5) For the nonzero numbers a, b, and c, define $(a,b,c) = \frac{a}{b} + \frac{b}{c} + \frac{c}{a}$. Find (2,12,9). (6)

6) How many ordered triples of positive integers (x,y,z) satisfy $(x^y)^z = 64$? (9)

7) What is $\frac{(2^4)^8}{(4^8)^2}$? (1)

Key Some Interesting Problems

① $(1+2^3)^{-1} + (1+2^{-3})^{-1} = 1$

$$\frac{1}{1+2^3} + \frac{1}{1+2^{-3}} \stackrel{?}{=} 1$$

$$\frac{1}{1+8} + \frac{1}{1+\frac{1}{8}} \stackrel{?}{=} 1$$

$$\frac{1}{9} + \frac{1}{\frac{9}{8}} \stackrel{?}{=} 1$$

$$\frac{1}{9} + \frac{8}{9} \stackrel{?}{=} 1$$

$$\frac{9}{9} \stackrel{?}{=} 1$$

$$1 = 1$$

② $a^7 = 30$

$(a^7)^3 = (30)^3$

$a^{21} = 27000$

③ $A = \pi r^2$

Doubled $A = \pi (2r)^2$

$A = 4\pi r^2$

(4)

④ $x = \frac{1}{4-y}$

$$\frac{1}{\frac{1}{4-y}} + 4\left(\frac{1}{4-y}\right) + y - \left(\frac{1}{4-y}\right)y - 1$$

$$4-y + \frac{4}{4-y} + y - \frac{y}{4-y} - 1$$

$$3 + \frac{4}{4-y} - \frac{y}{4-y}$$

$$3 + \frac{4-y}{4-y}$$

$3+1$

(4)

m KEY Some Interesting Problems Cont

(5) $\frac{a}{b} + \frac{b}{c} + \frac{c}{a}$ $a=2$ $b=12$ $c=9$

$\frac{2}{12} + \frac{12}{9} + \frac{9}{2}$

$\frac{6}{36} + \frac{48}{36} + \frac{162}{36}$

$\frac{216}{36} = 6$

(6) ordered triple $\rightarrow (x,y,z)$ $(x^y)^z = 64$

$2^6 = 64$

$(2^2)^3 = 64$ $(2,2,3)$

$(2^3)^2 = 64$ $(2,3,2)$

$(2^6)^1 = 64$ $(2,6,1)$

$(2^1)^6 = 64$ $(2,1,6)$

$4^3 = 64$

$(4^3)^1 = 64$ $(4,3,1)$

$(4^1)^3 = 64$ $(4,1,3)$

$64^1 = 64$ $(64,1,1)$

$8^2 = 64$

$(8^2)^1 = 64$ $(8,2,1)$

$(8^1)^2 = 64$ $(8,1,2)$

9 ordered triples

(7) $\frac{(2^4)^8}{(4^8)^2} = \frac{2^{32}}{(2^2)^{16}} = \frac{2^{32}}{2^{32}} = 1$

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Honors College Algebra
Unit 1 Review
Algebraic Expressions

Name KEY
Date _____
Period _____

List all of the sets of numbers (N, W, I, Q, Ir, R) to which the following numbers belong.

1. $\frac{8}{5}$ Q, R

2. 0 W, I, Q, R

3. $\sqrt{16}-8$ I, Q, R

4. 7.6321... Ir, R

Name the property illustrated by the problem.

5. $11+2+(-6)=-6+2+11$ Commutative Prop. of Addition

6. $\frac{2}{3}\cdot\frac{3}{2}=1$ Multiplicative Inverse

7. $(11+0)+6=11+6$ Additive Identity

8. $a+b$ is a real number. Closure of Addition

9. $\left|\frac{-7}{x}\right|=\frac{|-7|}{|x|}$ Property of Absolute Values

10. $-6x+24=2(-3x+12)$ Distributive Property

11. $7(x+4)=(x+4)\cdot 7$ Commutative Prop. of Mult.

12. $12+(-3)+(-12)-7=-3-7$ Additive Inverse

13. $(-2+6)+(4+7)=-2+(6+4)+7$ Associative of Addition

Use the order of operations to simplify.

14. $-3^2+18-5\cdot 2$

$-9+18-10$
$9-10$
(-1)

Evaluate:

15. $\frac{x-x\div 4}{2x}, x=8$

$\frac{8-8\div 4}{2(8)} = \frac{8-2}{16}$

$\frac{6}{16} = \left(\frac{3}{8}\right)$

16. $\left(\sqrt{2-3(-1)+4}\right)-9$

$(\sqrt{2+3+4})-9$
$(\sqrt{9})-9$
$3-9$
(-6)

17. $7-\{2[4+2-(6-7)]\}$

$7-[2(4+2-(-1))]$
$7-[2(4+2+1)]$
$7-[2(7)]$
$7-14$
(-7)

18. $|p^2+10|$ p^2+10

19. $|x-\pi|$, if $x<0$ $-(x-\pi)$ $-x+\pi$ $\pi-x$

20. $|5-\sqrt{26}|$ neg. $-(5-\sqrt{26})$ $-5+\sqrt{26}$ $\sqrt{26}-5$

21. $|-x^2-4|$ $-(-x^2-4)$ x^2+4

Simplify.

22. $\left(\frac{x^2}{3}\right)^{-2} = \left(\frac{3}{x^2}\right)^2 = \frac{9}{x^4}$

23. $(a^x)(4a^{3x})(2a^{2x})^{-1} =$ $\frac{4a^{4x}}{2a^{2x}} = 2a^{2x}$

24. $\left[\left(-7m^{-\frac{5}{2}}\right)\left(-m^{\frac{1}{2}}\right)\right]^{-1}$ $(-7^{-1}m^{\frac{5}{2}})(-m^{-\frac{1}{2}})$ $\frac{m^{\frac{4}{2}}}{7} = \frac{m^2}{7}$

25. $(5x^{-2})^{-3}(5x^{-1})$ $\left(\frac{x^6}{5^3}\right)\left(\frac{5}{x}\right) = \frac{x^6}{5^2x} = \frac{x^6}{25x} = \frac{x^5}{25}$

Write the fraction form for the repeating decimals.

26. $.3\overline{7}$ $\frac{34}{90} = \frac{17}{45}$

27. $.00\overline{637}$ $\frac{631}{99000}$

28. $.\overline{517}$ $\frac{517}{999}$